

REMARKS

Claim 1 has been amended by inserting a limitation that the device includes a hole transporting layer and a second limitation that the amount of the efficiency enhancing compound is from 1 to 30 wt. % of the LEL and is sufficient to provide an increase in luminous yield compared to no enhancing material. Support may be found in original claim 11; in Figure 1; and in the specification at page/line 21/13, 24/20, 28/6-31/26, 44/4, and 46/7. Claim 11 has been canceled.

The present claims are directed to an OLED device containing a hole transporting layer (HTL) and an amount of the enhancing material in the range of 1 to 30 wt % and sufficient to improve the luminous yield. The claimed device provides an advantageous luminous yield. The enclosed Declaration of Marina Kondakova serves to demonstrate this advantage..

Claims 1, 3, 4, 6-16, 18-22, 24 and 27-30 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Lamansky et al. (US 2004/0062947 A1). According to the Examiner:

Lamansky et al. discloses organic electroluminescent compositions comprising 1) a charge transport matrix, 2) at least one non-polymeric emissive dopant, and 3) at least one tertiary amine (see abstract). The compositions are used to form a layer for an OLED (see par. 19-21). The charge transport matrix may comprise small molecules such as 4,4'-bis(carbazol-9-yl)biphenyl (CBP) (see par. 44) (per the instant "host"). The emissive dopant may comprise phosphorescent chelated complexes of iridium (see par. 51) having phenylpyridine (ppy) as the ligands (see par. 54) (per the instant "phosphorescent guest material"). With regard to the "efficiency enhancing material", MTDATA is a preferred tertiary aromatic enamine for the composition (see page 11). It would have been obvious to have selected CBP, Ir(ppy)₃, and MTDATA for a composition to comprise a layer for an OLED, because Lamansky et al. teaches each of the materials, respectively, as the charge transport matrix, at least one non-polymeric emissive dopant, and at least one tertiary amine for the composition. With regard to amounts per instant claims 11-14, Lamansky teaches device structures having MTDATA in an amount of 28% of the composition and an iridium compound in an amount of 3% of the composition (see Table 2). It would have been obvious to have formed a device having MTDATA in an amount of 28% of the composition of the mixed layer and 3% Ir(ppy)₃ of the composition of the mixed layer, because Lamansky teaches such levels are desirable for an operational device.

Because Lamansky discloses the same materials as applicant, the properties of claim 1 are deemed to be inherently met by the reference. With regard to claim 23, it would have been obvious to one of ordinary skill in the art to have further incorporated an additional host material

other than CBP, because absent evidence otherwise “[I]t is prima facie obvious to combine two compositions taught by the prior art as useful for the same purpose, in order to form a third composition which is o be used for the very same purpose” (see *In re Kerkhoven*, 205 USPQ 1069, 1072 (CCPA 1980); *In re Susi*, 169 USPQ 423, 426 (CCPA 1971); *In re Crockett*, 126 USPQ 186, 188 (CCPA 1960)). Lamansky et al. teaches a color filter may be used with the device in order to achieve a desired color (i.e., white light) (see par. 92) per claims 24 and 27. It would have been obvious to one of ordinary skill in the art to have included a color filter in the Lamansky et al. device, because a filter is a commonly known means of achieving desired light emission color. With regard to claims 28-30, Lamansky discloses displays incorporating the devices (see par. 19).

In the enclosed Declaration it is demonstrated that luminance quality advantages are not obtained when the amounts of the enhancing material MTDATA are too high. In Table 4, it is shown that useful results are not obtained at very low or very high amounts. Best efficiency results are obtained at 10 and 15 %. Table 1 of the specification, with a somewhat different device format, showed a desirable range of 1-10%. It is apparent that the useful range of concentrations may vary somewhat with the particular device format and materials chosen. Thus, 1-30% represents an outside range of potential improved efficiency with 3-10% being preferred. In any event, the scope of the claim is limited to amounts that provide an improvement over the complete absence of the enhancing material.

The data in newly submitted Table 5 show the conjoint need for a hole transporting layer (HTL) and the enhancing material in an effective concentration range. Device 14 is inventive, having both an HTL and an effective concentration of enhancing material to yield improved luminous yield at 23,5 /Cd/A and power efficiency at 6.0 lm/W compared to Device 15 with no enhancing material and values of 19.9 and 5.4. When there is enhancing material and not an HTL (Device 16), the values are 17.2 and 5.0. When neither is present (Device 17), the results are 17.3 and 4.8. Clearly, one of ordinary skill in the art would not have expected improvements (Device 14 vs. Devices 15-17) of this magnitude. The enclosed Declaration indicates that the Declarant did not expect this advantage.

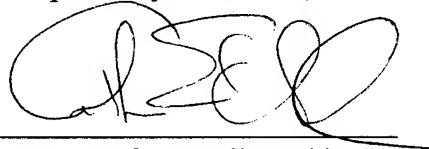
Lamansky does not employ a hole transport layer in his examples and provides no suggestion of any luminance benefit for doing so. He also suggests the addition of his additive for improving lifetime and reducing operating voltage, neither of which is related to luminous yield. In fact, his examples show that use

of his additive (in the absence of a HTL) generally results in a very large sacrifice of efficiency. Without the HTL and effective enhancement material and amount, the improved luminous yield is not obtained.

The Examiner's obviousness rejection of claims 25 and 26 also fails due to these same defects in the teachings of Lamansky.

In view of the amendments and Declaration and in view of the above distinctions, it is believed that the invention as presently claimed is patentably distinguished over Lamansky because the claimed combination of limitations would not have been obvious to one of ordinary skill in the art. The Examiner is respectfully requested to withdraw the outstanding rejection and to pass the subject application to Allowance.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'A. Kluegel', written over a horizontal line.

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If the Examiner is unable to reach the Applicant(s) Attorney at the telephone number provided, the Examiner is requested to communicate with Eastman Kodak Company Patent Operations at (585) 477-4656.